

been editorially amended to correct minor typographical and spelling errors. Claims 1-6 have been amended and new claim 7 has been added. Applicants submit that no new matter has been added, and notice to that effect is respectfully requested. Unless otherwise specifically stated, the claims have been amended to correct §112, second paragraph, issues, and for no other reason. Currently, claims 1-7 are pending.

New claim 7 depends from independent claim 4. Claim 7 recites that the apparatus of claim 4 also includes a magazine for storing ignition devices that are fed into the guidance tube. Claim 7 was added to more completely claim the subject matter of this application and to parallel coverage of the instant application to that in the British counterpart application, GB Patent No. 2307733. Applicants submit that no new matter has been added.

The Examiner objected to the disclosure for the misspelling of the word "detonated" at page 1, line 33. The specification has been amended to correct this spelling error as well as to correct other minor typographical and grammatical errors contained therein. Withdrawal of this objection is respectfully requested.

Claims 1-6 were rejected under 35 U.S.C. 112, second paragraph, for indefiniteness. This rejection is respectfully traversed.

Claims 1-6 have been amended to more clearly recite the present invention. The three phrases objected to by the Examiner have been eliminated or corrected in claims 1 and 4, respectively. Unless otherwise specifically stated, claims 1-6 were amended to address section 112, second paragraph, issues, noted by the Applicants, and for no other reason. Applicants submit that the pending claims are now in proper form, and withdrawal of this rejection is respectfully requested.

Figures 1-6 have been amended to correct the spelling of the label of each figure. In each drawing, "Figur" has been amended to read --Figure--. The drawing corrections have been submitted herewith, under separate cover of a Drawing Change Authorization Request. Acceptance of these drawing changes is respectfully requested.

The present invention relates to a method, an apparatus, and an ignition device for igniting combustible gases. In the present invention, an ignition device is launched toward a combustible gas region by medium pressure.

Applicants realized that there were a number of problems with conventional methods of igniting combustible gas released from a flare in a flare tower, such as excessively complex equipment and the need for high pressure propulsion. Other problems also encountered were an inability to stop the ignition device after it has been released and an inability to return an ignition device to its launcher. One prior solution uses a protective tube, which requires high pressure to launch the pellet.

Applicants solved these problems in the present invention. The present invention provides an ignition device which is guided out of a launching tube. It is not launched at high pressure, but at medium pressure. The ignition device may be programmed so that it can be stopped after being set in motion as well as returned to the launching means. The ignition device can be activated, as it is launched toward the flare from the launching means, by an electrical or mechanical device. Because the speed of the device is lower and controlled as compared to previous solutions, a smaller safety zone around the device is required and the danger to helicopter traffic near the flare tower is reduced.

More particularly, independent claim 1 is directed to a method for igniting

combustible gases from a flare of a flare tower. An ignition device, propelled by pressure through a guidance tube, is launched toward a region of combustible gas. The ignition device undergoes a reaction to ignite the gas in the combustible gas region by releasing a shower or cloud of sparks that strikes the gas in the combustible gas region. This reaction occurs when the ignition device exits the guidance tube or when it starts travelling through the guidance tube. Claims 2 and 3 depend from independent claim 1.

Independent claim 4 recites an apparatus of the present invention which includes a guidance tube, a pressure medium supply, a feeding unit, a control device, and a magazine for the ignition device. The ignition device ignites the combustible gas in a similar manner as recited in independent claim 1. Claims 5 and 7 depend from independent claim 4.

Claim 6, which depends from claims 4, 5, or 7, recites an ignition device that has the shape of an ignition pellet. The ignition pellet can be electrically or mechanically activated. Activation of the ignition pellet usually occurs when the ignition pellet exits the guidance tube or starts travelling through the guidance tube. The ignition pellet has a predetermined activation time and delay based on the particular type of flare and its application.

Claims 1 and 2 were rejected under 35 U.S.C. 103(a) as unpatentable Bjorkhaug et al in view of Lerouge et al. This rejection is respectfully traversed.

The Examiner believes that Bjorkhaug in view of Lerouge teaches or suggests the invention of claims 1 and 2. However, the Examiner is mistaken. Neither Bjorkhaug nor Lerouge, alone or in combination, teaches or suggests the claimed invention.

Bjorkhaug relates to a pyrotechnic ignition device that is launched by gas pressure in a launching tube and detonated by hitting a target plate in the vicinity of the emitted gas.

Bjorkhaug requires extremely complex equipment and very high pressure gas, on the order of 260-300 bar, to fire the ignition device. Also, there is no way in Bjorkhaug to stop the ignition device once it has been set in motion or to return it to its launcher.

Bjorkhaug does not teach or suggest that the ignition device itself undergoes a reaction to ignite the gas in the combustible gas region, as recited in independent claim 1. Bjorkhaug requires that its pyrotechnic ignition device strike a target plate 24 in order to ignite the emitted gas. Thus, Bjorkhaug does not teach the ignition device of claim 1.

Bjorkhaug also requires high pressure to expel the ignition device from a launching tube. High pressure is on the order of 260-300 bar, as described above. The invention, however, propels the ignition device by medium pressure through a guidance tube, as recited in claim 1. Therefore, Bjorkhaug fails to teach medium pressure propulsion of claim 1.

Thus, Bjorkhaug alone does not teach or suggest the invention of claim 1.

Lerouge is unable to overcome the deficiencies in Bjorkhaug. Lerouge relates to ignition devices which are launched by explosive charges. In Lerouge, like in Bjorkhaug, the ignition device cannot be returned to the launcher after being set in motion. Lerouge also does not teach that the ignition device itself undergoes a reaction. Similarly, Lerouge fails to teach that the ignition device is propelled by medium pressure.

Further, the ignition device in Lerouge is not activated after being set in motion, as claimed in claim 1. Rather, in Lerouge, the ignition device is ignited so that combustion occurs and completes along a trajectory that is 1.2 to 3 times the distance between casing 4 and point 7. (Lerouge, column 4, lines 15-19). This is not the ignition device of the claimed invention.

Moreover, there is no tube in which the device is launched disclosed in Lerouge. Furthermore, the ignition device of Lerouge could not be launched in a tube since the ignition device is combusting throughout its trajectory from casing 4 to point 7 and beyond, up to 3 times that distance, as described in Lerouge, column 4, line 15-19.

Claim 2 depends from allowable independent 1, and thus, is allowable over the cited art. Therefore, Bjorkhaug and Lerouge, alone or in combination, do not teach or suggest the invention of claims 1 or 2.

Finally, there is no motivation to combine Bjorkhaug and Lerouge. Bjorkhaug requires a tube from which the ignition device is expelled. Lerouge, however, does not include one, since the ignition device combusts throughout its trajectory. Therefore, such a combination would destroy the functionality of Bjorkhaug.

Furthermore, the only motivation to combine provided is that of the Examiner himself where he says "it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Bjorkhaug [] to provide a predetermined combustion time of the ignition device ... as taught by Lerouge et al. because, this allows for complete combustion of the ignition device, so that once it has ignited the combustible gas, it will not be capable of setting the surrounding environment of the torch/flare tower on fire ..." *Paper No. 4, pages 3-5, item 8*, emphasis added. The Examiner, however, misunderstands Lerouge and fails to recognize, as pointed out above, that because the ignition device is combusting throughout its trajectory, Lerouge cannot be combined with Bjorkhaug without destroying Bjorkjaug. Therefore, there is no motivation to combine these references.

For the foregoing reasons, withdrawal of this rejection is respectfully requested.

Claim 3 was rejected under 35 U.S.C. 103(a) as unpatentable over Bjorkhaug in view of Lerouge as applied to claims 1 and 2 above, and further in view of Henwood. This rejection is respectfully traversed.

Claim 3 depends, directly and indirectly, from allowable claim 1, and thus, is also allowable over the cited art.

Bjorkhaug and Lerouge are discussed above. Henwood relates to an ignition flare propelled by pressure through a guiding tube to light a pilot burner. This is simply a stack lighter.

Henwood, however, does not overcome the deficiencies of Bjorkhaug and Lerouge. Henwood fails to teach that an ignition device is propelled by medium pressure or that the ignition device can be returned to its launching means after having been set into motion, as in the claimed invention. Thus, none of Bjorkhaug, Lerouge, or Henwood, alone or in combination, teach or suggest the invention of claim 3.

Furthermore, there is no motivation to combine Bjorkhaug, Lerouge, and Henwood. As in the previous rejection, the only motivation to combine is the Examiner's statement that "it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Bjorkhaug [] to suitably regulate the air pressure ... because faster travel of the ignition device could produce a draft capable of prematurely extinguishing the flame or sparks, and to allow the ignition to be returned to its starting position" *Paper No. 4, page 5, item 9*, emphasis added. The claimed invention does not regulate air pressure to avoid a draft which might extinguish a flame; the ignition device of the claimed invention reacts after exiting the guidance tube. Thus, the Examiner's assertion is entirely without merit or basis.

Also, while Bjorkhaug and Lerouge relate to ignition devices, Henwood relates simply to lighting a pilot burner. One of ordinary skill in the art would not seek to combine these references to provide the claimed invention. Lacking motivation to combine, this is a case in which the Examiner has improperly used the claims as a blueprint as a basis to combine the references, which is impermissible hindsight. There is no motivation to combine these references.

Accordingly, for the foregoing reasons, withdrawal of this rejection is respectfully requested.

Claims 4-6 were rejected under 35 U.S.C. 103(a) as unpatentable over Bjorkhaug et al. in view of Lerouge as applied to claims 1 and 2 above, and further in view of Breese, Jr. This rejection is respectfully traversed.

As described above, Bjorkhaug and Lerouge both fail to teach that an ignition device itself reacts and that an ignition device is propelled by medium pressure through a guidance tube. Breese, which relates to ignition of an oil burning furnace, fails to overcome these deficiencies. Therefore, none of Bjorkhaug, Lerouge or Breese, alone or in combination, teaches or suggests the invention of claims 4-6.

As set forth above, there is no motivation to combine these references other than the Examiner's. Without proper motivation to combine references, this is a clear case of the use of impermissible hindsight by the Examiner, and this rejection cannot stand.

Accordingly, withdrawal of this rejection is respectfully requested.

Alternatively, claims 1-3 were rejected under 35 U.S.C. 103(a) as unpatentable over Henwood in view of Smith and Lerouge, and claims 4-6 were rejected under 35 U.S.C. 103(a)

as unpatentable over Henwood in view of Smith and Lerouge as applied to claims 1-3, and further in view of Swanson and Breese, Jr. These rejections are respectfully traversed.

There is no motivation to combine any of these references. This is a case of the Examiner using the claims as a blueprint, which is impermissible hindsight. As evidenced in the Examiner's own comments, the claims were used as a blueprint to combine these references.

The Examiner starts with the Henwood reference, which relates to a simple stack lighter and discusses lighting a pilot burner. The Examiner suggests modifying Henwood to use the ignition device of Smith to cause a reaction in the form of a cloud of sparks, which, according to the Examiner will be more likely to light a source of combustible gas than a flame which could be extinguished due to wind or other means as it travels up the flare tower. Then, the Examiner suggests that, to provide a predetermined combustion time of the ignition device based on the particular torch or flare tower used, look to the Lerouge reference because Lerouge discusses complete combustion of the ignition device. Next, according to the Examiner, modify the Henwood and Smith combination with Lerouge because, "once it has ignited the combustible gas, it will not be capable of setting the surrounding environment of the torch/flare tower on fire." *Paper No. 4, pages 7-8, item 11*. This "rationale" set forth by the Examiner simply pulls features from references to match elements recited in the claims without consideration of whether there is any basis for combination in the references or if such a combination is even operable, as required by the caselaw and the MPEP. In the following section of Paper No.4, the Examiner performs a similar "analysis" with respect to claims 4-6.

The caselaw and the MPEP require some motivation in the references to combine their teachings. As there is none in the instant rejections, these rejections cannot stand. Accordingly, withdrawal of these rejections is respectfully requested.

For the forgoing reasons, the pending claims are allowable over the cited art. Accordingly, early action allowing this application is respectfully requested.

Respectfully submitted,

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